

light of Japan" had, as was customary at this season of the year when the weather is very cold, stormy, and clear, been observed by fishermen in the Shimbara Gulf and Japanese waters. The article went on to say that these lights were referred to in native school-books, and attributed to electrical phenomena. On mentioning the matter, however, to the leading Europeans in Yokohama and Tokio, they appeared to have no knowledge of the matter.

Captain Castle, of H.M.S. *Leander*, informed me that, not long ago, the officers of his ship saw lights in the same locality which they thought at first were caused by a ship on fire. The course of the vessel was altered at once with a view of rendering assistance, but finding that the lights increased their altitude as he approached, he attributed them to some volcanic disturbance, and being pressed for time, resumed his course.

The background of high land seen on the first night dispels all idea of these extraordinary lights being due to a distant volcano. The uniformity of the bearing renders the theory of their being fires on the shore most improbable. I am inclined to the belief that they were something in the nature of St. Elmo's fires. It is probable that there are travellers among the readers of your interesting journal who have seen or heard of this phenomenon, and will be able to describe its origin and the atmospheric conditions necessary for its appearance.

CHAS. J. NORCOCK.

H.M.S. *Caroline*, Hongkong, April 10.

The Greatest Rainfall in Twenty-four Hours.

IN NATURE, May 4, Mr. Clement Wragge, of Brisbane, confidently asserts that Queensland has beaten the world's record in the extraordinary amount recorded on February 3, viz., 35.7 inches. I am sorry to have to take away such an unenviable palm from Queensland, by recalling a fact well known to every Indian meteorologist that the highest record extant belongs to Chirapunji, in the Khasia hills, where on June 14, 1876, 40.8 inches were recorded in the twenty-four hours. Not only so, but on the 12th 30 inches fell, and in the four days, from the 12th to the 15th inclusive, as much as 102 inches. Of course the effects were not so disastrous in this case, as indeed such a state of things is little removed from the normal at Chira in the early part of June, but I have a very clear recollection of it as I was at Chirapunji on the 12th and 13th, and not far from it on the memorable 14th.

The conditions which have occurred in Queensland and the North Island of New Zealand during the last six months have been a remarkable example of persistent abnormalities, and though the total number of rational causes may still be wanting to explain everything, one or two were evidently in operation when I was there from October to January, and I am confident that from the empirical law of persistency, coupled with a few rational inferences, a forecast of impending floods could have been made and can be made for the future, much in the same way as the general character of the monsoon can be foretold in India.

May 13.

E. DOUGLAS ARCHIBALD.

A Dust-whirl or (?) Tornado.

IN NATURE (vol. xl. p. 174) you kindly allowed me to describe a dust-whirl seen to originate on a heated dust-covered highway. The phenomenon has just been repeated under much similar circumstances, only in this instance the column of dust after oscillating to and fro on the highway for about half a minute, moved rapidly away in a curvilinear path in a northerly direction, the lower end of the whirl catching up loose material in its track where it touched the ground, which it did at intervals of from ten to fifteen yards, carrying the strawy litter from a strawberry bed upwards of 50 yards in the air. It appeared to dissipate into the upper air when crossing a meadow some 300 yards from its place of origin. The characteristic "swish" of the rushing air was very marked, and the four motions common to all tornadoes (see Lieut. Finley's "Character of Six Hundred Tornadoes"), viz. whirling from right to left, progressive motion to the north, a curvilinear track, and the dipping up and down, were all distinctly traced. The question therefore, naturally arises—Can these dust-whirls be tornadoes in miniature?

Conditions at the time of the occurrence:—Date, Thursday, May 11, 1893; time, 11 a.m. Corrected barometer, 30.327 (falling slightly). Dry bulb, 66°.5; wet, 51°.8 = rel. hum. 38 per cent. Wind, south; force, 1. Some upper cirrus radiating from north-east, and drifting slowly from north-west,

showing top and bottom arcs of halo at 10 a.m. Black bulb *in vacuo* 128°.2; weather very warm and dry.

Driffield, May 11.

J. LOVEL.

What becomes of the Aphis in the Winter?

I HAVE spent many weeks this spring closely observing the budding trees, with the object of discovering in what condition of life the aphis spends the winter; as the result of my observations, which were made under the microscope, I believe that the aphidæ during the autumn (or as many of them as have reached the state of reproduction) attach themselves to the stem of the tree, with their young inside them, in much the same way as the female members of the closely-allied family coccidæ do. In course of time the mother-aphis becomes simply a dried skin serving as a protection to the young. When the warm days of spring come these are developed and easily make their way through the skin and crawl on to the young leaves, there to begin their work of sucking and reproduction.

T. A. SHARPE.

Soot-figures on Ceilings.

MAY I suggest a distinct, if not an alternative cause for Prof. E. B. Poulton's soot figures in NATURE, April 27th? The ceiling plaster is very porous, except where it is in contact with the joists, etc. At such points very little deposit occurs compared with the spaces where the hot air is vigorously diffusing through into the cold space above. I suggest this because I am very familiar with a large ceiling where the rafters are thus picked out in light shades. Even the laths are picked out, but less distinctly. The main bolts likewise show dark, as in Prof. Poulton's sketch, as if there were an air-space by them. There is no perceptible difference in the figures near the central chandelier from those in the corners remotest from heating causes. The bombarding pattern is often very well shown where super-heated water pipes run along a white-washed wall. The effect of every little break, even a nail in the wall, is most striking.

J. EDMUND CLARK.

A Difficulty in Weismannism Resolved.

IN my letter of the 1st inst. an omission of parentheses and quotation marks, which I omitted to note on the proof, alters the sense of the paragraph with quotations from the "Germ Plasm," pp. 434-5. It should be as follows:—"The note runs thus: 'Compare Marcus Hartog, NATURE, vol. xlv. p. 102,' (the reference omits my letter of Oct. 31, 1891). 'The deductions made by this author are logically correct but are no longer justifiable, since I myself have gained further insight into the problems concerned.' " The absence of the inverted commas disguises this recognition by Weismann of the validity of my objections, and of the consequent change in his own views.

Cork, May 15.

MARCUS HARTOG.

NOTES.

THE Hon. Ralph Abercromby has given to the Royal Society of New South Wales the sum of £100, which is to be offered as prizes with the object of bringing about exhaustive studies of certain features of Australian weather. So far only one feature has been selected, and a prize of £25 is now offered for an exhaustive study of the well-known "Southerly Buster." It is understood that no essay which does not deal fully with the following points will be considered:—(1) The motions of the various strata of clouds for some hours preceding, at the time of, and following the "buster;" (2) the weather conditions which lead up to and follow the "buster," with weather charts of Australia for the day of occurrence and the following day; (3) the general conditions which modify the character of the "buster;" (4) The area of the "buster" and its track; (5) barograph traces showing the changes of pressure during the "buster;" (6) the direction and character of wind preceding it; (7) the relation of "busters" to rainfall. The essay must not exceed 50 pages of foolscap, and must be sent in not later than March 31, 1894. It must embody studies of several "busters," and must be chiefly the result of original research of the author, but authors

are not debarred from making use of any available information, published or otherwise, on the subject. A photograph of each "buster" described, giving a characteristic view of the cloud roll should, if possible, be sent with the essay.

DR. N. WILLS has been appointed ordinary professor of botany at the University and Director of the Botanic Gardens at Christiania.

A MOST disastrous landslip occurred on the night of May 18, at Vaerdalen, in the district of North Trondhjem. Vaerdalen is a straggling country town with about 6000 inhabitants, and is an agricultural centre. The landslip occurred in the outskirts of the town, where there are a number of houses occupied by peasants, each farming his own land. The subsidence was so sudden and severe that between thirty and forty of these farmhouses fell instantaneously in ruins, leaving scarcely a wall standing. Twenty-two of the demolished houses were of considerable size, and many people were asleep in them when the catastrophe happened. The number of victims is estimated at close upon one hundred. The loss of property is very great. According to a Reuter's telegram, from which we learn these details, the most fruitful part of the Vaerdals-Elv Valley lies under a mass of mud and slime, and it is feared that further landslips will occur.

DURING the past week the day temperatures over the British Islands have been mostly below 70° in the south and west, while in the north of Scotland several of the maximum readings have not exceeded 55° . On the 18th inst. rainy weather had become general, with thunderstorms in many places; on that morning some heavy falls were measured, Ardrossan reporting 0.75 inch, York 0.74 inch, Loughborough 1.60 inch, and Jersey 0.91 inch, while on the following days large amounts were measured in various parts of Ireland. A small depression lying off the south-east coast of England on Sunday, the 21st inst., also brought over half an inch of rain to that part of the country, while in the early part of the present week the distribution of atmospheric pressure was favourable for further falls over the country generally. The *Weekly Weather Report* of the 20th inst. showed that the excess of temperature for that week ranged from 4° in the northern districts to 6° in most parts of England, that the rainfall was rather less than the mean in the north of Scotland, and equalled, or exceeded it, in all other districts. From the beginning of the year there is a deficit in all districts, amounting to 5.3 inches in the west of Scotland. Bright sunshine was below the average amount in all districts.

A PAPER on "Wreck-raising in the River Thames" was read by Mr. C. J. More, engineer to the Thames Conservators, at the meeting of the Institution of Civil Engineers on May 16. Mr. More mentioned that during the past eleven years seventy-four steamers of 55,758 tons register, fifty-four sailing vessels of 9,128 tons, and three hundred and one barges of 11,956 tons, being a total of 76,842 tons register of shipping, had been raised by the Conservancy lighters.

THE death of the well-known engineer, Mr. E. A. Cowper, is announced. He was in his seventy-fourth year. Mr. Cowper displayed much ingenuity as an inventor, and was connected with many technical institutions, including the Institution of Civil Engineers, of the council of which he was a member, the Institution of Mechanical Engineers, of which he was president in 1880-81, and the Iron and Steel Institute.

A MAP of the smokes of Paris has been recently prepared by M. Foubert, of the Tour Saint Jacques. The idea is to note the position of the principal factory chimneys, to observe during the day the emission of smoke, then to indicate

on the map, for each chimney, by means of circles of various sizes and tints, the extent of the nuisance. There are obvious defects (as M. Delahaye points out in the *Revue Industrielle*) in such a mode of representation. Thus no account is taken of smoke from the environs, which materially affects Parisian air. The black particles emitted from factory chimneys in some cases sink rapidly, but in others are long maintained in suspension. Then there is the large emission of smoke from private dwellings. M. Delahaye manifests some partiality for city smoke; he remarks on its antiseptic properties in time of epidemic, and on the screening action, whereby it prevents losses of heat by radiation.

AT the meeting of the Linnean Society of New South Wales on March 29 Prof. David contributed a note on the discovery by him of the mineral sphene *in situ* in granite at the Bathurst water-works. In the latest edition of his work on the minerals of New South Wales, Prof. Liversidge has described a single well-formed crystal of sphene from New South Wales, but the exact locality from which it came is uncertain. In the Bathurst granite crystals of sphene are abundant, and vary in size from $\frac{1}{16}$ th up to $\frac{1}{4}$ inch in longest diameter. The crystals are of a very deep brown colour, and feebly translucent. In chemical composition the mineral is a compound of silica, lime, and titanous acid.

M. VERNER has a note in the *Journal de Physique* on an explanation of the rotation of the plane of polarisation in a magnetic field based on de Reusch's experiments. From the experimental fact that a pile of birefringent plates in which the principal sections are arranged helically rotates the plane of polarisation, it follows that a birefringent body turning about a direction perpendicular to its optical axis will rotate the plane of polarisation of a ray which traverses it parallel to the axis about which it is rotating. For if the body is supposed divided into a series of plates by planes perpendicular to the axis of rotation, while the light is traversing the first plate the body will have turned through an angle, and therefore the principal plane of the second plate will be inclined to the direction which the principal plane of the first plate occupied when the light passed through it. Thus if the speed of rotation is comparable with the velocity of light the plane of polarisation will be rotated. This being so, the author makes the hypothesis that, in a magnetic field, at any given moment, the magnetic stress at a point on a line of force is only exerted in a certain azimuth normal to the direction of the line, and that the plane containing the portion of the line of force, and the direction of this stress, turns about the direction of the line of force with a velocity proportional to the intensity of the magnetic field at the point. Hence, when a substance such as carbon bisulphide is placed in a magnetic field, this magnetic stress, transversal to the lines of force, causes the body to become birefringent, with its principal plane coinciding with the direction of this stress, and if, as is supposed, this direction rotates, the principal plane will rotate, and the substance will exhibit magnetic rotatory power. The above explanation accounts for the fact that the direction of the rotation is independent of the direction in which the ray of light traverses the magnetic field.

THE extensive researches of Pellat have shown the considerable change produced in the value of the difference of potential between the layers of air covering two metals in contact by the least chemical or mechanical alteration of the surfaces. In the *Journal de Physique* for May M. Gouré de Villemontée describes his attempts to prepare metallic surfaces which shall give a constant difference. For this purpose he deposits the metal by electrolysis on plates of copper, or on small lead shot, and has studied deposits of iron, nickel, zinc, and copper made from solutions of different salts, at tempera-

tures ranging from 10° to 40° C., and with varying current densities. The method adopted to determine the difference of potential consists in forming, with the two plates which are being experimented on, a condenser having its plates joined by a wire in which an opposing electromotive force could be produced. The conclusions the author arrives at are, that the difference of potential at the point of contact of two electrolytically deposited layers of the same metal is independent of the density of the current, and of the temperature and composition of the solution used in forming the deposit. He also finds that two deposits prepared at different times are identical, and give no contact difference of potential even when as much as a month elapses between their preparation.

AN improved apparatus for exhibiting the phenomena of gaseous diffusion is described by Prof. V. Dvorák in the *Zeitschrift für Physikalischen Unterricht*. A porous pot such as is used for galvanic batteries, but in a fresh and clean condition, is well closed by a greased cork through which pass a bent glass rod and a glass tube. The tube is attached to a narrow india-rubber tube leading to a horizontal capillary glass tube ending in a small cup. The capillary tube contains a drop of alcohol which serves as an indicator. The earthenware pot is placed in an inverted position, the glass rod serving as a handle. A tray of sulphuric acid containing pieces of zinc is placed under an inverted beaker, which collects the hydrogen evolved and is then slipped over the porous pot. The gas, entering the pot by diffusion more rapidly than the air leaves it, drives the drop of alcohol quickly outward. A similar effect is produced by coal-gas, and the opposite effect by carbonic acid or ether. This may also be strikingly shown by lightly breathing into the beaker and applying it to the porous pot, when the displacement of the drop will indicate the presence of the heavier gas in the breath.

It is a common belief in India that, if a cobra is killed, and the remains are left in a bungalow, others of the species will be attracted to the spot. A correspondent of the *Pioneer Mail* records an incident which appears to indicate, as he says, that there is some truth in this theory. About nine months ago Col. Ilderton killed a very large cobra in the compound of his bungalow at Dinapore, and had its skin stuffed and set up by a native mochee. Since then the compound has been infested with these snakes, and no less than eight full-grown cobras, measuring from 4 ft. 8 in. to 5 ft. 4 in., have been killed there; one of which was sitting up, with its hood extended, contemplating the house where the remains of its preserved friend were. It is a curious fact that every snake when found was making in the direction of the bungalow, and most of them showed fight when tackled. The last two were within a few feet of each other, when Col. Ilderton killed them with a stick, and were advancing up the carriage drive together. No cobras have been seen in other parts of the station.

MR. HOPE HUNTER, writing in the *Journal of the Royal Agricultural and Commercial Society of British Guiana* on gold in that colony, says that the explorer has no reason to penetrate further than two hundred miles inland for the discovery of new and extensive gold fields, but that, if he desired to extend research further, the debatable land between the colony and the Brazilian possessions in the south would offer a favourable field for exploration. Mr. Hunter has been made acquainted with some particulars of an expedition composed of a party of Americans to that part some years ago. They discovered abundant evidence of the country being rich in precious metals, but the hostility of the Indians, culminating in the massacre of nearly the entire party, prematurely terminated their investigations, the few survivors making their escape with much difficulty. Mr. Hunter says that this portion of the South American continent is inhabited by various Indian tribes who are believed

to practise cannibalism, and that one tribe, the Pianoghotto, on the confines of British Guiana, are well known for their inveterate hostility to strangers, many instances having been recorded of their having repulsed and murdered boats' crews penetrating to their country from the Brazilian side.

SEVERAL parcels of land and fresh-water mollusks collected by Prof. José N. Rovirosa, mainly in the State of Tabasco, Mexico, were sent last summer to the Academy of Natural Sciences, Philadelphia. As some of them are of considerable interest, a list has been prepared by Mr. H. A. Pilsbry, and is printed in the latest instalment (Part III.) of the Academy's "Proceedings" for 1892. The list is illustrated with several figures brought together on a single plate.

THE bulk of fine gloves produced in Russia are made, it seems, from foal skins. So says the U.S. Consul-general at St. Petersburg in a recent report on the subject. Very little is done in Russia, he says, in the manufacture of gloves from sheep, goat, or kid skins. Much hand-labour is needed to prepare foal skins for gloves, and it is doubtful whether they could be profitably used in countries where hand labour is dear. When well dressed they are very durable, and at the same time delicate, and have a great advantage in taking well all sorts of dyes.

THE report of the United States Commissioner of Fish and Fisheries for the fiscal year ending June 30, 1889, has just been issued. Among the appendices is an elaborate and valuable report on the fisheries of the Pacific coast of the United States, by J. W. Collins. The scope of this report is limited to a consideration of such fisheries as are prosecuted in or from the region embraced between the southern extremity of California and the north-western limit of Washington. Incidentally, a somewhat extended reference has been made to certain phases of fishery in Alaska, in explanation of industries which are controlled by capitalists of San Francisco, or elsewhere, and constitute a part of the fishing interests of the region specially treated of in the report.

THE *Journal of Geology*, which is being issued from the University Press of Chicago, promises to be a periodical of much interest to geologists. Two numbers have been published, and among the contents are papers on the pre-Cambrian rocks of the British Islands, by Sir Archibald Geikie; geology as a part of a college curriculum, by H. S. Williams; an historical sketch of the Lake Superior region to Cambrian time, by C. R. van Hise; the Glacial succession in Ohio, by F. Leverett; traces of Glacial man in Ohio, by W. H. Holmes; and the volcanic rocks of the Andes, by J. P. Iddings.

MESSRS. GAUTHIER-VILLARS ET FILS have added to their "Encyclopédie Scientifique des Aide-Mémoire" a volume entitled, "Traité Pratique de Calorimétrie Chimique," by M. Berthelot, secretary of the Academy of Sciences. In the same series have been published "L'Art de Chiffrer et Déchiffrer les Dépêches Secrètes," by the Marquis de Viaris; "Unités et Étalons," by C. E. Guillaume; and "Principes de la Machine à Vapeur," by E. Widmann.

A VOLUME containing an excellent account of "The Story of the Atlantic Telegraph," by Henry M. Field, has been issued by Messrs. Gay and Bird. The "story" is one of profound interest, and the author tells it vigorously and clearly. He is a brother of the late Cyrus W. Field, and has therefore had access to many new and important sources of information. He does full justice to the part played by his brother in the great enterprise, but does not underrate the services rendered by "the science and seamanship, the capital and the undaunted courage, of England."

A SECOND edition of Mr. W. W. Rouse Ball's "Short Account of the History of Mathematics" (reviewed in NATURE, vol. xxxix. p. 265) has been issued by Messrs. Macmillan and Co. The author has revised the book and made some changes in detail, but he explains in the preface that the general character of the work—as a popular account of the leading facts in the history of mathematics—remains unaltered.

MESSRS. CASSELL AND CO. have published a fifth edition of "The Field Naturalist's Handbook," by the late Rev. J. G. Wood and the Rev. Theodore Wood.

MESSRS. ASHER AND CO., Berlin, have begun the publication of a series of reprints of remarkable writings and maps relating to meteorology and earth-magnetism. The series is handsomely printed, and edited by Prof. G. Hellmann. The first two numbers are L. Reynmann's "Wetterbüchlein von wahrer Erkenntniss des Wetters" (1510), and Pascal's "Récit de la Grande Expérience de l'Équilibre des Liqueurs" (1648).

MESSRS. C. GRIFFIN AND CO. have published the tenth annual issue of the "Year-Book of the Scientific and Learned Societies of Great Britain and Ireland." The work comprises lists of the papers read during 1892 before societies engaged in fourteen departments of research, with the names of the authors.

MESSRS. FRIEDLÄNDER & SON, Berlin, have published an inaugural dissertation, prepared with a view to the attainment of a doctor's degree at Göttingen, by Johannes Müller, embodying the results of researches on the anatomy of Compositæ. The essay is illustrated with four plates.

A CATALOGUE of the types and figured specimens in the geological department of the Manchester Museum, Owens College, by Herbert Bolton, has been issued as one of the "Museum Handbooks." In the same series appear an "Outline Classification of the Vegetable Kingdom," by F. E. Weiss, and a second edition of Prof. Milnes Marshall's "Outline Classification of the Animal Kingdom."

THE Geological and Natural History Survey of Minnesota has published as one of its Bulletins (No. 7) a volume on "The Mammals of Minnesota." It is described on the title-page as "a scientific and popular account of their features and habits." The work is illustrated with twenty-three figures and eight plates.

A WORK on the "Geology of the Eureka District, Nevada," with an atlas, by Arnold Hague, has been published by the United States Geological Survey. It forms the twentieth volume of the Survey's "monographs." The author explains in the preface that the work is purely geological in its scope and is mainly a careful study and survey of a comparatively small block of mountains, which may be designated the Eureka Mountains, but which should not be confounded with the Eureka mining district, as several other well-known but less important mining districts lie wholly within the same mountain area.

THE first part of M. E. Burnat's important *Flore des Alpes Maritimes* has just been published.

A REPORT of the results so far obtained from Bornmüller's botanical travels in southern Persia is published in the *Mittheilungen* of the Thuringian Botanical Association.

DR. P. H. MELL has prepared for the U.S. Department of Agriculture a valuable report on the climatology of the cotton plant.

AN important series of well-crystallising double halogen salts of tellurium with potassium, rubidium, and caesium, have been

prepared by Mr. H. L. Wheeler, and are described in the current number of the "Zeitschrift für Anorganische Chemie." They correspond to the general formula M_2TeR_6 , where M represents potassium, rubidium, or caesium and R chlorine, bromine, or iodine. They all crystallise in octahedrons belonging to the cubic system, in this respect resembling the platinochlorides and other kindred double halogen salts of that type. The crystals of the chlorides possess a bright-yellow colour, those of the bromides various shades of deep red, while those of the iodides are quite black and opaque. In order to prepare the chlorides, tellurium is converted into tellurous acid by means of nitro-hydrochloric acid; the solution is evaporated to dryness, and the residue dissolved in hot hydrochloric acid. Upon adding to the solution of tellurium tetrachloride so obtained an aqueous solution of the chloride of the alkali metal, a crystalline precipitate of the double chloride is obtained. In the case of the caesium salt, Cs_2TeCl_6 , a precipitate is obtained even in very dilute solutions, owing to the difficult solubility of the salt. Upon boiling the precipitate dissolves, and on cooling brilliant little yellow octahedrons are deposited. The presence of excess of either caesium chloride or tellurium tetrachloride is quite immaterial; indeed, the salt may be recrystallised from a solution of either. Water at once decomposes it, with production of a voluminous white precipitate of tellurous acid H_2TeO_3 . It is only stable in solution in presence of a little free hydrochloric acid. Concentrated hydrochloric acid precipitates it from solution in the form of microscopic octahedra. The rubidium salt, Rb_2TeCl_6 , is more soluble so that precipitation only occurs in concentrated solutions. The crystals, moreover, are usually much larger than those of the caesium salt. The potassium salt, K_2TeCl_6 , is much more soluble, and is even deliquescent. An excess of tellurium tetrachloride is necessary in its preparation, and it is best obtained in good crystals by spontaneous evaporation of a dilute hydrochloric acid solution.

THE bromides are obtained by dissolving finely divided elementary tellurium and caesium bromide in dilute hydrobromic acid containing excess of bromine. In the preparation of the caesium salt, Cs_2TeBr_6 , the solution is effected at a moderately elevated temperature, and the concentrated solution deposits large brilliant red octahedrons of the salt upon cooling. The rubidium salt, Rb_2TeBr_6 , is readily obtained in magnificent deep red octahedrons by spontaneous evaporation of the solution prepared at the ordinary temperature. In preparing the potassium salt, if a hot solution is made, octahedral crystals of the anhydrous salt, K_2TeBr_6 are obtained, but if the concentration is effected by spontaneous evaporation light red coloured rhombic crystals of a hydrated salt, $K_2TeBr_6 \cdot 2H_2O$, are deposited. The iodides are prepared by addition of the alkaline iodide to a solution of tellurous acid in hydriodic acid. The caesium salt, Cs_2TeI_6 , is so difficultly soluble that it was only obtained as a finely divided black powder. The rubidium salt, however, Rb_2TeI_6 , is more soluble and is precipitated in microscopic black octahedrons. The potassium salt is deposited in the hydrated form, $K_2TeI_6 \cdot 2H_2O$, in long monoclinic prisms which lose their water of crystallisation at $100-115^\circ$ and become converted into a dull black powder consisting of the anhydrous salt.

SIMULTANEOUSLY with the above work of Mr. Wheeler, Drs. Muthmann and Schäfer, of Munich, have been engaged in investigating the formation of double halogen salts of the alkali metals with tellurium and selenium, and in the current number of the "Berichte," an account of some corresponding selenium compounds is given. Analogous chlorides were found to be incapable of preparation in presence of water, but the corresponding potassium and ammonium selenium

bromides have been obtained in good crystals. When selenious acid is dissolved in hydrobromic acid and to the solution of selenium tetrabromide thus formed a solution of potassium bromide is added, and the mixture evaporated and allowed to cool, a deep orange-coloured precipitate is produced, consisting of small regular octahedrons of potassium selenium bromide, K_2SeBr_6 . These crystals are decomposed by water like those of the tellurium salts previously described, a colourless solution being obtained which contains selenious and hydrobromic acids and potassium bromide. They dissolve without decomposition, however, in dilute hydrobromic acid and separate from the solution again upon evaporation. The ammonium salt $(NH_4)_2SeBr_6$ is likewise readily obtained by employing ammonium bromide instead of potassium bromide. A precipitate of minute dark-coloured regular octahedrons is usually at once obtained upon adding the ammonium bromide, and the mother liquor after filtration yields by spontaneous evaporation beautiful garnet red octahedrons, modified by faces of the cube, which frequently exceed half a centimetre in diameter and exhibit a brilliant semi-metallic lustre.

NOTES from the Marine Biological Station, Plymouth.—Last week's captures include a number of the Lücarnian *Depastrum cyathiforme* (one individual exhibiting a lateral bud), several varieties of the Actinian *Thoë* (*Sagartia*) *sphyrodeta*, the Mollusca *Septiola atlantica*, *Philine aperta* and *Æolidiella Alderi*, and species of the Cumacean genera *Diastylis*, *Iphinoë* and *Pseudocuma*. There has been no noteworthy change in the floating fauna. The following animals, in addition to the larger number of those already recorded, are now breeding:—the Actinian *Urticina felina* (= *Tealia crassicornis*), the Cumacean *Pseudocuma cercaria*, the Brachyura *Xantho floridus* and *rivulosus* and the Echinid *Echinus miliaris*.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*, ♂), a Lion (*Felis leo*, ♀) from South Africa, presented by Mr. Frederick Vaughan Kirby; a Mozambique Monkey (*Cercopithecus pygerythrus*, ♂) from East Africa, presented by Mr. Lewis Atkinson; a Sykes's Monkey (*Cercopithecus albigularis*, ♂) a Garnett's Galago (*Galago garnetti*) from East Africa, presented by Mr. Thomas E. C. Remington; a Diana Monkey (*Cercopithecus diana*, ♀) from West Africa, presented by Surg.-Major S. J. Flood; a Japanese Deer (*Cervus sika*, ♂) from Japan, presented by Mr. C. J. Lucas; two Emus (*Dromaeus novae-hollandiae*) from Australia, presented by Mr. Charles E. Milburn; four Sociable Marsh Hawks (*Rostrhamus sociabilis*) from South America, presented by Mr. G. R. Gibson; two Madagascar Weaver Birds (*Fondia madagascariensis*) from Madagascar presented by Mr. Ginn; a Laughing Kingfisher (*Dacelo gigantea*) from Australia, presented by Mr. W. B. Brett; a Radiated Tortoise (*Testudo radiata*) from Madagascar, presented by Mr. B. Smith; a Bonnet Monkey (*Macacus sinicus*, ♂) from India, (two Mexican Guans (*Penelope purpurascens*) from Central America, a Wattled Guan (*Uburria carunculata*) from United States of Columbia, deposited; a White-lipped Peccary (*Dicotyles labiatus*, ♂) from South America, an Orange-winged Amazon (*Chrysotis amazonica*) from South America, twelve Spotted Salamanders (*Salamandra maculosa*) European, purchased; a Reindeer (*Rangifer tarandus*, ♂) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE TOTAL SOLAR ECLIPSE (APRIL, 1893).—In *Comptes Rendus* for March 15 (No. 20) M. Deslandres gives a brief preliminary account of some of the main results that he has been

able to gather from the photographs taken by him during the recent total solar eclipse. The instrumental equipment that he had, enabled him to obtain photographs of the corona, to study its spectrum, to examine the coronal light in the most refrangible part of the ultra-violet region, and to measure the rotation of the corona by the method of the displacement of lines in the spectrum. The coronal photographs showed luminous jets of a length equal to twice the diameter of the sun, while the general outline had a form somewhat usual at times of maxima spot frequency. With regard to the spectroscopic results, the large dispersion that was employed in one case was found to have been too great; but from the photographs taken with the small dispersive instrument at least fifteen new coronal and chromospheric lines have been discovered. Perhaps the most interesting results obtained relate to the rotation of the corona. The negatives showed the spectra of two points exactly on opposite sides of the corona, situated in the equatorial plane of the sun, at a distance equal to two-thirds of his diameter. The lines in the spectra indicated large displacements, which on measurement were found to correspond to velocities of 5 and 7 kilometres. The conclusion to be gathered from such a result as this is that the corona must travel nearly with the disc in its motion and thus be subject to its periodical rotational movement.

THE ECLIPSE OF APRIL, 1893.—It is very satisfactory to hear that the photographs taken by the English party situated at Fundum, on the west coast of Africa, have, on closer examination, turned out very excellent. There seems great reason also to believe that many old points may be cleared up, while hope is also entertained of raising some new ones.

FINLAY'S PERIODIC COMET.—A telegram from Kiel informs us that Finlay's comet has been found. It runs as follows:—

18 May, 16h. 15m. 6s., Capetown
R.A. 355° 30' 18" N.P. D. 95° 1' 50"
Dim.

VARIABLE STAR NOMENCLATURE.—Now that a systematic means has been adopted for numbering the minor planets until their orbits are fully recognised, much unnecessary confusion has been avoided. Just as it was with asteroids so it is with variable stars, many stars being termed such although their variability has not been confirmed. To correct such errors and to eliminate various other sources of misnotation, such as that of putting a catalogue letter in front of the constellation in which the star is situated, when another star in the constellation is so known in the star maps, Prof. Chandler adds a few notes with reference to the catalogue which will now soon be forthcoming (*Astronomische Nachrichten* 3161). He also gives a partial list of some of the letters that will be adopted to avoid further complexity.

JUPITER'S SATELLITES.—In this column, vol. xlvii., p. 518, we referred to the important work that was being carried on at Arequipa by Prof. Pickering with reference both to the telescopic appearances of Jupiter and his system of satellites. Since that time further observations, more especially of the satellites, have occupied his attention, and an account of them is given in the current number of *Astronomy and Astrophysics* (No. 115). The first investigation he undertook was to find out whether the rotations of the satellites on their axes were retrograde or direct. To do this the alternate lengthening and shortening of the discs were minutely observed, use being made of the revolution of the earth, since it is on this account that after opposition with direct motion of rotation a given phase will be presented earlier, and with retrograde motion a given phase will be presented later than if the observations had been made from the centre of the sun. Working with the first satellite it was found that a series of observations occupied about two hours, and upon the hypothesis of a direct rotation the synodic period was 13h. 3m. 25.8s., and upon a retrograde motion hypothesis, 13h. 3m. 10.8s. The conclusion of the discussion of the observations here given is that the rotation is probably retrograde. In the clear air of Arequipa, and with excellent instrumental equipment, Prof. Pickering has been able to make many quite unique observations. We have mentioned before the flattening of the disc of the second satellite when about to undergo an occultation. This observation has later been confirmed, and thus shown to be a genuine observed fact. The reappearance of the third satellite on January 27 has given perhaps a better series of observations of this atmospheric effect. When the satellite was half uncovered "it was noted that the cusps were distinctly rounded as in the case with the sun when